



# Prioritized Technology: Instruments to Locate Regions of Habitability from Orbit/Flyby

## Technical Goals

- Determine elemental composition of a planetary surface with **< 10m\*** spatial resolution and identify minor components with **< 1%** abundance.
- Detect surface organic molecules on a planetary surface with **< 10m** spatial resolution at less than 10% abundance.
- Determine ice thickness with 10% depth resolution over 100 × 100 m area on surface.

\* <10 m driven by desire to identify regions suitable for landing or sample collection – remote sensing requirements depend on both instrumental performance and orbital/flyby parameters.

## Technical Status/ SOA

### Elemental composition

- GRS/Mars Odyssey: spatial resolution ~120-300 km, Si, Fe, H, Cl, K, That precision 0.1-1%
- GRaND/Dawn: spatial resolution ~160 km (0.4\*altitude), Fe and water-equivH with < 1% precision, K with 40 ppm precision, other eltsharder

### Mineralogy/organics

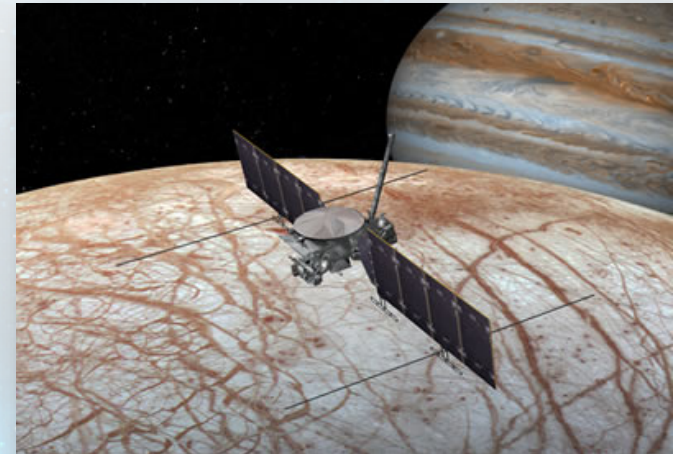
- MISE/Europa Clipper: ≤ 25 m/px,%-level organics
- VIR/Dawn: 450 m/px,%-level organics and minerals

### Ice thickness

- REASON/Europa Clipper: 15-150 m/px

## Mission Applications

- Identification of regions within Ocean Worlds where biogenic molecules may be present on the surface in order to identify promising landing site.
- Identification of regions within Ocean Worlds where the ice shell is thin enough to make penetrating to the subsurface ocean feasible.



*Europa Clipper*